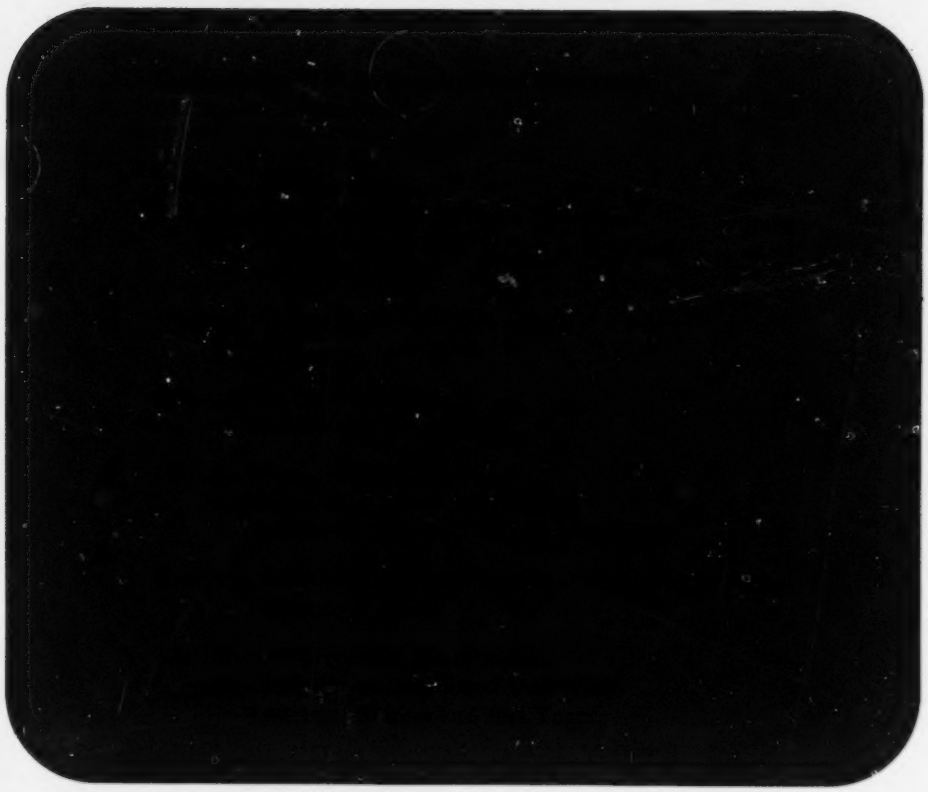
A3273-8

Vol. 55 No. 11 November 1980

Medical Education

PUBLICATION OF THE ASSOCIATION OF AMERICAN MEDICAL COLLEGES



BEST AVAILABLE COPY

Journal of Medical Education

Volume 55 • Number 11 • November 1980

Career Paths of First-Year Resident Physicians: A Seven-Year Study—Kathryn M. Langwell 897

Medicine and Marketing: The Case of Graduate Medical Education—Michael R. Czinkota, Wesley J. Johnston, and Eric C. Jelly 906

Medical Problem-Solving: A Reanalysis—William C. McGaghie 912

Selecting for Medical School—Rudolph H. Weingartner 922

Humanistic Geriatric Health Care: An Innovation in Medical Education—Beatrice K. Rose and Harold T. Osterud 928

Reliability and Validity Studies on Modified Essay Questions—Grahame I. Feletti 933

The Effect of Screening, Sensitization, and Feedback on Notation of Depression—Lawrence S. Linn and Joel Yager 942

Communications: Primary Care Training in a Traditional Medical Residency: An Ambulatory Care Rotation—John D. Goodson, John D. Stoeckle, and Alexander Leaf 950

Evaluation of a Basic Science, Peer Tutorial Program for First- and Second-Year Medical Students—Fernando M. Trevino and D. C. Eiland, Jr. 952

Medical Students' Conflicting Perceptions of Alcoholic Patients—Bernard J. Bergen, Trevor R. P. Price, and Jean Kinney 954

Allocation of Time and Perceived Coping Behavior of First-Year Medical Students—Fredric M. Wolf, Jack G. Ulman, Glenn A. Saltzman, and Mark L. Savickas 956

The Dialysis Exercise: A Clinical Simulation for Preclinical Medical Students—Richard A. Bernstein, F. Patrick McKegney, and Lelon A. Weaver 958

Sleep Behavior and Examination Results of Medical Students—Colin Michael Shapiro, Philip Press, and Robert Weiss 960

Medical Residents' Difficulty in Learning and Utilizing a Psychosocial Perspective—Elliot Schildkrout 962

'Bug-in-the-Ear' Technique for Teaching Interview Skills—D. Daniel Hunt 964

Briefs 967

Editorial: Antipathy Toward Science 968

Datagram: MCAT Scores and Academic Records of Natural Science and Humanities Majors Applying to Medical School, 1978–79 971

Book Review 973

Bibliography 975

Letters to the Editor 981

Officers of the Association and Members of the Executive Council, 1979–80

CHAIRMAN: Charles B. Womer, *University Hospitals of Cleveland*
CHAIRMAN-ELECT: Julius R. Krevans, *University of California, San Francisco*
PRESIDENT: John A. D. Cooper, *AAMC, Washington, D.C.*

COUNCIL OF DEANS
Stuart Bondurant, *University of North Carolina**
Steven C. Beering, *Indiana University*
Neal L.Gault, Jr., *University of Minnesota*
William H. Luginbuhl, *University of Vermont*
Richard Janeway, *Bowman Gray*
Allen W. Mathies, Jr., *University of Southern California*
John E. Chapman, *Vanderbilt University*
Leonard M. Napolitano, *University of New Mexico*

COUNCIL OF ACADEMIC SOCIETIES
Carmine D. Clemente, *UCLA-Brain Research Institute**
Thomas K. Oliver, Jr., *University of Pittsburgh*
Daniel X. Freedman, *University of Chicago*
David M. Brown, *University of Minnesota*

COUNCIL OF TEACHING HOSPITALS
John W. Colloton, *Iowa Hospitals and Clinics**
Robert M. Heyssel, *Johns Hopkins Hospital*
Stuart J. Marylander, *Cedars-Sinai Medical Center*
John Reinertsen, *University of Utah Medical Center*

ORGANIZATION OF STUDENT REPRESENTATIVES
Dan Miller, *University of California, San Diego**
Lisa Capaldini, *University of California, San Francisco*

DISTINGUISHED SERVICE MEMBER
Robert J. Glaser, *Henry J. Kaiser Family Foundation*

* Chairman of respective organization.

TABLE 3

Patient Characteristics by Specialty and Sex of Physicians, 1978

Specialty*	Mean Percentage of Patients											
	Female				White				Over 65			
	Male Physicians		Female Physicians		Male Physicians		Female Physicians		Male Physicians		Female Physicians	
	Mean	S.E.	Mean	S.E.	Mean	S.E.	Mean	S.E.	Mean	S.E.	Mean	S.E.
General/family practice	61.4	0.4	69.7	1.5	84.7	0.7	78.6	2.0	34.3	0.7	26.1	1.7
Internal medicine	57.4	0.4	62.1	1.9	85.1	0.7	76.2	2.6	43.6	0.9	37.1	2.5
Surgery	54.0	0.4	52.0	1.7	83.9	0.5	82.6	2.3	36.0	0.6	29.1	2.7
Pediatrics	50.4	0.3	52.1	0.6	78.0	1.6	68.2	2.1	2.2	1.0	0.7	0.5
Obstetrics-gynecology	99.8	0.1	99.2	0.4	81.7	1.1	79.1	2.1	11.5	0.8	10.7	1.2
Radiology	53.8	0.6	52.0†	2.0	79.1	1.7	72.3†	4.8	38.8	1.4	33.9†	4.3
Psychiatry	56.8	0.8	64.3	1.4	88.0	1.0	83.1	1.7	9.1	0.7	7.5	1.2
Anesthesiology	55.8	1.1	54.9	2.1	80.6	1.6	67.8	3.4	30.6	1.6	30.3	2.5
Other	53.8	0.9	58.6	1.8	76.6	1.3	70.7	2.8	27.4	1.2	21.5	2.3
All specialties	59.5		62.4		83.1		77.5		30.5		25.0	

* The mean for all specialties is a weighted mean. The mean for each specialty was weighted by the proportion of physicians in the population of office-based physicians in that specialty.

† Fewer than 30 observations.

SOURCE: Twelfth Periodic Survey of Physicians, 1978, American Medical Association Center for Health Services Research and Development.

Career Paths of First-Year Resident Physicians: A Seven-Year Study

Kathryn M. Langwell

Abstract—Much policy formulation and research on physician manpower supply and demand are based upon historical data on physicians or on medical students' attitudes toward career choices and expectations about future career plans. Neither of these sources provides the kind of information about specialty and location choices of recent graduates that planners require to design and evaluate effective policy. In order to obtain information on career decisions of young physicians, all 1968 first-year resident physicians were identified and their careers were followed through the seven-year period from 1968 through 1975. The career decisions of this cohort were compared with the activity, specialty, and geographic distribution of all physicians in 1975 in an attempt to discern changes, or trends, in these decisions. Results of this evaluation indicate that young physicians are attracted to nonprimary-care specialties in greater numbers than were physicians in the past and are continuing the trend away from rural practice locations. Increasing numbers of women physicians are affecting these trends, and changes in the sex-composition of the physician stock must be taken into account in future forecasting efforts and in policy formulation activity.

Concern about the availability of, and access to, medical care in the United States has been a cause of numerous policy actions designed to influence the career decisions of young physicians. Loan forgiveness programs, establishment of the National Health Service Corps scholarship programs, and preferential medical school admissions programs were developed to address the issue of geographic maldistribution of physician manpower. Interest in affecting the specialty choices of young physicians also is apparent in the provisions of the Health Professions Educational Assistance Act of 1976 (P.L. 94-484), which tie capitation grants to medical schools to a requirement that at least 50 percent of affiliated residency programs be in primary care specialties (family practice, internal medicine, pediatrics, and obstetrics-gynecology).

Forecasts of future supply of physicians' services by specialty and geographic location may be developed on the basis of trends which are apparent from examination of changes in the total number of physicians. Alternatively, surveys of medical students or young physicians may be conducted to determine projected career plans of a specific group (1, 2). The infor-

Ms. Langwell was a research associate, Center for Health Services Research and Development, American Medical Association, at the time an initial draft of this paper was prepared; she currently is with Applied Management Sciences, Inc., Silver Spring, Maryland. The views expressed in this paper are the author's and do not necessarily reflect those of the American Medical Association or of Applied Management Sciences, Inc.

mation obtained from analyses based either on historical data or on prospective plans of individuals may be inadequate for purposes of policymakers, however. Historical data do not provide indications of changes in recent medical school graduates' perceptions and preferences. This is a critical issue, currently, as the sex- and racial-composition of U.S. medical students has changed substantially during recent years. In addition, fluctuations in the numbers and countries of origin of foreign medical graduates have been frequent and dramatic over the past decade. Although surveys of student attitudes and career plans might appear to resolve at least the first problem raised, information obtained in these surveys may be even more unreliable than are historical data, since medical students' career plans may change as they progress through the medical education system. Longitudinal studies of young physicians' careers provide the most reliable data on career preferences of physicians. In the past, data limitations, that is, small or nonrepresentative samples, have made this type of study difficult or have restricted the applicability of findings to policymaking efforts.

The purpose of this paper is to present information on career paths of all young physicians who began an initial U.S. residency in 1968. These young physicians' careers are followed through 1975; and data are presented on the following issues of interest to medical educators and to policymakers: licensure and certification, major professional activities, specialty choices, and location decisions. The information available is presented separately for men and women residents.

In addition to summary data on young physicians' career decisions, comparative data for all U.S. physicians are presented for major professional activity, specialty, and geographic distribution. These comparisons are shown in order to reveal changes in these factors which may represent trends that should be considered in both policy-formulation and forecasting efforts. It should be recognized that this group of physicians completed undergraduate medical education 12 years ago, and there have been substantial changes in health professional education in the past decade (for example, the expansion of family practice residency programs, and continuing increases in the number of women medical students). Data on a more recently graduated cohort of physicians are not available for analysis due to the time lag between graduation and establishment of medical practice and the months required for data collection and processing considerations. Thus, the summary information on career decisions of young physicians presented in this paper are based on the most recent national physician cohort data available, and it adds useful information to the existing literature on physicians' career decisions.

Data

Data for this study are from the American Medical Association's Physician Masterfile. The Physician Masterfile contains information on every physician in the United States and on those graduates of U.S. medical schools who are temporarily practicing overseas. The file also includes graduates of foreign medical schools who are in the United States and meet U.S. educational standards for recognition as physicians.

A record is started for each physician upon his entry into medical school or, in the case of foreign and Canadian graduates, upon entry into the United States. As the physician's training and career develops, additional information is added to the file (for example, indication of internship and residency training, licensure, and board certification). In addition to these historical data, current information such

as address, professional activity, and employment status is continually updated (3).

The research file used for this study was constructed by identifying all individuals in residency programs in 1968 who were not in practice or in a residency program in 1967. These records of 1968 first-year residents were then selected for follow-up. Information on subsequent residency programs, licensure, certification, and other professional data were obtained from the AMA Physician Masterfile for each year from 1969 through 1975 for each resident. Thus, a seven-year record of career decisions of these young physicians was constructed.

Characteristics

Examination of this population of physicians reveals that 1968 first-year residents exhibited the following characteristics:

1. Men physicians were the preponderant majority, making up 88.3 percent of the group. Only 11.7 percent (1,456 persons) were women physicians.

2. Foreign medical graduates (FMGs) represented 34.1 percent of all 1968 first-year residents. Only 31.4 percent of men were FMGs, however, compared with 54.9 percent of women physicians.

3. The age of first-year residents ranged from 21 years to 62 years. However, 70.5 percent were 25–28 years old in 1968 (Table 1).

4. Almost 15 percent of first-year residents completed one continuous residency program only and then went directly to medical practice or engaged in other nonpatient care activity (Table 2).

5. Eighty-five percent of residents had two or more residencies involving a change in specialty area or emphasis or a move to a different hospital for training in the same specialty; 40.8 percent participated in a third residency program; and 10.7 percent reported four to six residency programs between 1968 and 1975 (Table 2).

6. In 1975 there were 1,091 physicians who remained in residency programs. This represented 8.7 percent of the initial pop-

TABLE 1

Age Distribution of 1968 First-Year Resident Physicians in U.S. Programs, by Sex

Age	1968 First-Year Resident Physicians					
	All		Men		Women	
	No.	Percent	No.	Percent	No.	Percent
Under 25	706	5.6	558	5.0	148	10.2
25	2,380	19.1	2,093	19.0	287	19.7
26	4,047	32.4	3,696	33.5	351	24.1
27	1,463	11.7	1,313	11.9	150	10.3
28	911	7.3	785	7.1	126	8.7
29	629	5.0	546	5.0	83	5.7
30	479	3.8	418	3.8	61	4.2
31	397	3.2	350	3.2	47	3.2
32	310	2.5	288	2.6	22	1.5
33	203	1.6	179	1.6	24	1.6
34	169	1.4	142	1.3	26	1.8
35	143	1.1	121	1.1	22	1.5
36	118	0.9	100	0.9	18	1.2
37	75	0.6	68	0.6	7	0.5
38	79	0.6	65	0.6	14	1.0
39	58	0.5	49	0.4	9	0.6
Over 39	308	2.5	247	2.2	61	4.2
Total	12,475	100.0	11,019	100.0	1,456	100.0

ulation. No information was available on whether these 1,091 physicians had been continuously in residency training programs during the seven-year period. It is possible that they had completed a residency program, established a medical practice or accepted a salaried position, and then decided to seek additional training after practicing for some period. During the time period of this study, men physicians were required to serve in the military. Some physicians may have completed one or more years of residency training, joined the military forces, and then reentered residency training after completion of their military obligation. Unfortunately, due to data limitations, it was not possible to examine these possibilities. Women were less likely to be in residency programs seven years after the initial residency; only 4.6 percent of women were reported in training in 1975. Foreign medical graduates were even less likely than women physicians to be in residency programs in 1975, with only 3.4 percent of FMGs remaining in graduate medical training for seven years.

Licensure and Certification

The vast majority of resident physicians were licensed to practice medicine in 1975 (Table 3). Full licensure in at least one state was reported for 90.2 percent of the group, and 98.5 percent of the total group were licensed, fully or temporarily, in the state in which they were practicing. Women were less likely to be fully licensed than were men, with only 84.0 percent reporting full licensure in any state; however, 97.7 percent of all women were licensed in the state in which they were practicing. This finding is apparently a result of the large proportion of women physicians who were FMGs.

TABLE 2

Distribution of 1968 First-Year Residents in U.S. Programs, by Number of Residency Training Programs Entered During 1968–1975 and by Sex

No. of Residency Programs	1968 First-Year Resident Physicians					
	All		Men		Women	
	No.	Percent	No.	Percent	No.	Percent
1	1,824	14.6	1,576	14.3	248	17.0
2	5,561	44.6	5,001	45.4	560	38.5
3	3,755	30.1	3,298	29.9	457	31.4
4	1,124	9.0	968	9.3	156	10.7
5	181	1.5	146	0.8	35	2.4
6	30	0.2	30	0.3	0	0.0
Total	12,475	100.0	11,019	100.0	1,456	100.0

TABLE 3

1975 Licensure Status of 1968 First-Year Resident Physicians in U.S. Programs, by Sex

Licensure Status	1968 First-Year Resident Physicians					
	All		Men		Women	
	No.	Percent	No.	Percent	No.	Percent
Full licensure	11,247	90.2	10,024	91.0	1,223	84.0
Temporary licensure	1,030	8.3	830	7.5	200	13.7
Not licensed	198	1.5	165	1.5	33	2.3
Total	12,475	100.0	11,019	100.0	1,456	100.0

The trend toward board-certification noted in other studies (4) is also evidenced by these young physicians (Table 4). Of the entire group, 46.1 percent (5,760 physicians) held one specialty board certification in 1975. A second board certification was already obtained by 120 physicians by that year. Women physicians were less likely to be board-certified than men (39.6 percent versus 48.1 percent). A majority of U.S. medical graduates were certified (54.2 percent) in 1975. However, only 34.4 percent of foreign medical graduates has sought or achieved board-certification by that time. These findings are consistent with results of other studies of FMGs and may possibly be explained by the fact that FMGs in many cases are already trained as specialists prior to coming to the United States. Consequently, they may be unwilling to spend the number of years in training which are requisite for board-eligibility.

Major Professional Activity

It was assumed, when this study was initiated, that seven years after residency training was initiated, the overwhelming majority of physicians would have completed training and established a practice. Examination of the major professional activity of these physicians in 1975 (Table 5) suggests that while most appear to have settled into their careers, a substantial minority remain in non-patient-care or in training positions.

The 57.5 percent of all first-year resident physicians who were either in office-based practice or on hospital staffs represents a smaller proportion of the total group than is found when these categories are combined for all U.S. physicians. In particular, 1968 first-year residents were considerably less likely to be in office-based practice by 1975 than are older physicians. However, it is possible that a substantial number of those on hospital staffs who currently are in residencies or are nonclassified may enter office-based practice as their careers progress.

Residents in 1968 appear to be slightly more likely than all U.S. physicians to be teaching or in research but are less likely to have entered administrative positions by 1975. Women physicians, however, were more likely than men to be in administrative or teaching positions but were slightly less likely to be engaged in research in 1975. Women physicians, in general, were considerably less likely than men to be in office-based practice seven years after their initial residency. They were also less frequently in hospitals, either as staff members or as continuing residents. Over four percent (62) of the women subjects reported their status as "inactive" in 1975. No information was available on the reasons for the "inactivity" of these women physicians and on whether their current status was viewed as permanent withdrawal from their career or was a temporary response to family (for

TABLE 4

Board Certification Status of 1968 First-Year Resident Physicians in U.S. Programs in 1975, by Sex

Board Certification Status	1968 First-Year Resident Physicians					
	All		Men		Women	
	No.	Percent	No.	Percent	No.	Percent
Not board certified	6,595	52.9	5,716	51.9	879	60.4
Board certified						
One specialty	5,760	46.1	5,193	47.1	567	38.9
Two specialties	120	1.0	110	1.0	10	0.7
Total	12,475	100.0	11,019	100.0	1,456	100.0

TABLE 5

Major Professional Activity of All U.S. Physicians and of 1968 First-Year Resident Physicians in U.S. Programs, by Sex, as of December 31, 1975

Major Professional Activity	1968 First-Year Resident Physicians						All U.S. Physicians*	
	All		Men		Women			
	No.	Percent	No.	Percent	No.	Percent	No.	Percent
Office-based practice	4,772	38.3	4,313	39.1	459	31.5	216,533	52.9
Hospital staff	2,389	19.2	2,137	19.4	252	17.3	38,833	9.5
Resident physician	907	7.3	854	7.8	53	3.6	63,046	15.4
Administration	117	0.9	101	0.9	16	1.1	11,689	2.9
Research	291	2.3	261	2.4	30	2.1	8,514	2.1
Teaching	257	2.1	218	2.0	39	2.7	6,935	1.7
Other†	3,651	29.3	3,106	28.1	545	37.4	41,779	10.1
Inactive	91	0.7	29	0.3	62	4.3	22,117	5.4
Total	12,475	100.0	11,019	100.0	1,456	100.0	409,446	100.0

* Data in these columns are from *Profile of Medical Practice*, 1978 (5).

† Includes those whose major professional activity was unknown or was not classified as of the end of 1975.

example, pregnancy) or other considerations. In addition, a much larger proportion of women physicians (37.4 percent) were nonclassified by 1975 than was the case for men physicians.

Results of this examination of major professional activity of 1968 first-year resident physicians have implications both for future research activities and for policy formulation. These findings indicate that a majority of young physicians may not have chosen a definite practice mode or employment setting seven years after embarking on graduate medical training. Consequently, researchers may find it necessary to follow a given cohort of physicians for a longer period than this study encompassed in order to make definitive observations on current patterns in selection of professional activity mode.

Specialty Choices

The specialty mix of the physicians practicing in the United States has been a topic of increasing concern of policymakers in recent years. The decline in the proportions of young physicians choosing general or family practice and a less rapid, but persistent, decrease in primary care specialization raise questions with respect to access to primary care for future patient populations.

The 1975 specialty distribution of 1968 first-year resident physicians is shown in Table 6. Only 5.9 percent of men and 4.3 percent of women were reported being in general practice in 1975, compared with 15.9 percent of all U.S. physicians in that year. This dramatic difference in general practice choices suggests that few, if any, of these practitioners will be available in the future. In addition, data in Table 6 indicate that, overall, fewer young physicians are choosing primary care as a specialty area than has been the case in past years. Only 37.5 percent of young men and 45 percent of young women physicians were in primary care specialties in 1975. Almost 50 percent of all U.S. physicians, in contrast, were in primary care specialties in that year. With the exception of pediatrics, women physicians in the 1968 resident group were less likely to be in primary care than were men physicians.

Women were more likely than men, in the 1968 residents group, to be in psychiatry, anesthesiology, or "other" specialties. Men, on the other hand, were most fre-

TABLE 6

Specialty Distribution of All U.S. Physicians and of 1968 First-Year Resident Physicians in U.S. Programs, by Sex, as of December 31, 1975

Specialty	1968 First-Year Resident Physicians						All U.S. Physicians*	
	All		Men		Women			
	No.	Percent	No.	Percent	No.	Percent	No.	Percent
General/family practice	722	5.8	660	5.9	62	4.3	65,102	15.9
Internal medicine specialties	2,311	18.5	2,107	19.1	204	14.0	83,527	20.4
Surgical specialties	2,877	23.1	2,827	25.7	50	3.4	89,259	21.8
Pediatric specialties	1,015	8.1	725	6.6	290	19.8	27,433	6.7
Obstetrics/gynecology	745	6.0	645	5.9	100	6.9	26,205	6.4
Radiology	974	7.8	881	8.0	93	6.4	19,653	4.8
Psychiatry	914	7.3	769	7.0	145	10.0	28,661	7.0
Anesthesiology	633	5.1	504	4.6	129	8.9	15,559	3.8
Other specialties†	2,284	18.3	1,901	17.2	383	26.3	54,047	13.2
Total	12,475	100.0	11,019	100.0	1,456	100.0	409,446	100.0

* Data in these columns are from *Physician Distribution and Medical Licensure in the U.S.*, 1976 (3).
† Include cases where the 1975 primary specialty was unknown.

quently in a surgical specialty, despite the fact that opportunities to train in these specialties presumably have become more accessible to women in recent years. Men physicians were also more often found in radiology specialties than were women or than were physicians in earlier years. This shift may represent a response to the extremely high incomes which have been reported for radiologists in recent years when compared with other specialties (5).

The specialty distribution of 1968 first-year resident physicians, after seven years, indicates that concern about declining availability of primary care physicians is justified, and that within the near future general practice may disappear. However, the development and expansion of family practice residency programs during the 1970s is not reflected in the observed specialty composition of this cohort of physicians. Interest in family practice may counteract the decline in general practice among more recent medical school graduates.

Within the primary care specialties, pediatrics is increasing, proportionately, while internal medicine represents a decreasing proportion of primary care practice. The increasing numbers of women physicians are primarily responsible for this shift in emphasis—almost 20 percent of these women chose pediatric specialization. Availability of primary care services to the adult population may become a serious problem in the future if the decline in interest in these specialities persists.

Geographic Distribution

More attention has been devoted to geographic maldistribution of physicians than to specialty choices. A number of programs have been in existence for a decade or more which are oriented toward affecting location choices of young physicians. Although the lack of physician manpower in rural areas has been a central concern, more recently attention has focused on inner-city areas and disadvantaged populations.

The geographic distribution in 1975 of 1968 first-year resident physicians is presented in Table 7. Using the demographic country classification scheme adopted by the American Medical Association, it is

TABLE 7

Geographic Distribution of U.S. Population, Nonfederal U.S. Physicians and 1968 First-Year Resident Physicians, by Sex, as of December 31, 1975

Classification by County Population	1968 First-Year Resident Physicians						All U.S. Nonfederal* Physicians†		U.S. Population†	
	All		Men		Women					
	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.	Percent
Possessions	74	0.6	65	0.6	9	0.6	3,317	0.9	NA‡	NA‡
Less than 10,000	39	0.3	37	0.3	2	0.1	2,289	0.6	4,536,400	2.1
10,000–24,999	214	1.7	202	1.8	12	0.8	8,921	2.4	14,867,100	6.9
25,000–49,999	446	3.6	426	3.9	20	1.4	14,391	3.9	16,787,900	7.8
Non-SMSA over 50,000§	558	4.5	523	4.7	35	2.4	19,186	5.1	17,077,700	8.0
Potential SMSA	226	1.8	207	1.9	19	1.3	5,977	1.6	4,279,500	2.0
SMSA 50,000–499,999	1,849	14.8	1,736	15.8	113	7.8	64,647	17.3	40,550,400	18.9
SMSA 500,000–999,999	1,453	11.6	1,315	11.9	138	9.5	47,911	12.8	26,756,300	12.5
SMSA 1,000,000–4,999,999	4,376	35.1	3,811	34.6	565	38.8	144,224	38.7	66,156,800	30.8
SMSA over 5,000,000	1,828	14.7	1,490	13.5	338	23.2	62,248	16.7	23,537,100	11.0
Other**	1,412	11.3	1,207	10.9	205	14.1	—	—	—	—
Total	12,475	100.0	11,019	100.0	1,456	100.0	373,111	100.0	214,549,200	100.0

* Data on county distribution of all U.S. physicians were not available in published form.

† Data in these columns are from *Physician Distribution and Medical Licensure in the U.S., 1976*, (3).

‡ Not available.

§ SMSA = Standard Metropolitan Statistical Area.

** "Other" includes all non-U.S. locations and address-unknown cases.

apparent that the physicians in this group are more urban oriented than were older physicians. While 3 percent of all U.S. physicians are located in rural counties with less than 25,000 population, only 2 percent of the 1968 resident group were located in these areas in 1975. Less than 1 percent of women physicians chose these very rural practice locations, and women physicians are disproportionately concentrated in the most populous urban areas. Sixty-two percent of women physicians in the 1968 group were located in Standard Metropolitan Statistical Areas with over one million population.

The decline in rural practice location decisions, due to declining interest for male physicians and to increasing numbers of women physicians with strong urban preferences, suggests that alternative modes of primary care delivery in rural areas may be necessary as the availability of physicians in private practice decreases. On the other hand, the increasing numbers of physicians in urban areas may indicate that inner-city residents will have more easily accessible services.

Conclusions

Examination of the career paths of all 1968 first-year resident physicians provides information on changes in physicians' career decisions which may be of use to both researchers and policymakers. The major points of interest which emerge from this study follow:

1. An apparent decline in interest in office-based practice is observed. Alternatively, or perhaps in addition, it may be that the time lag between initial residency and final career choices is greater than the seven-year period used in this study.

2. General practice is approaching extinction. In addition, primary care specialists continue to decline as a proportion of all physicians, while surgery, radiology, and other nonprimary specialties are increasingly frequent choices.

3. The decline in rural practice location choices has continued among this group of 1968 first-year resident physicians.

4. It appears that professional activity, specialty choices, and practice location patterns will change more rapidly because of changes in the sex-composition of the nation's physicians. As women become a larger proportion of all physicians in future years, attention to the impact of this shift will be necessary for policy formulation and for forecasting attempts.

References

1. *Career Choices of the 1976 Graduates of U.S. Medical Schools.* Washington, D.C.: Association of American Medical Colleges, 1977. (NTIS No. HRP0900007)
2. McGrath, E., and Zimet, C. N. Female and Male Medical Students: Differences in Specialty Choice Selection and Personality, *J. Med. Educ.*, **52**:293–300, 1977.
3. Goodman, L. J. *Physician Distribution and Medical Licensure in the U.S., 1976.* Chicago: American Medical Association, 1977.
4. Langwell, K. M. An Evaluation of Income Incentives and Board-Certification Trends. *J. Med. Educ.*, **54**:539–543, 1979.
5. Gaffney, J. C. (Ed.). *Profile of Medical Practice, 1978.* Chicago: American Medical Association, 1978, P. 255.

DATAGRAM

MCAT Scores and Academic Records of Natural Science And Humanities Majors Applying to Medical School, 1978–79

Discussion has occurred recently in several arenas regarding the value of attracting varied and broadly prepared applicants to schools of medicine. Often the intended focus of such discussions is applicants with humanities backgrounds. Therefore, it was thought to be instructive to look at candidates with humanities majors and compare some of their characteristics with those of the largest group, that is, natural science majors.

Of the applicants to medical school in 1978–79, 67.4 percent were natural science majors and 2.8 percent were humanities majors. These proportions have been similar in previous years. A comparison of the qualifications of these two groups of examinees, applicants, and accepted candidates is presented.

Table 1 presents grade-point averages (GPAs) for natural science and humanities majors for applicants and accepted students. On the average, humanities majors applied with slightly lower GPAs in both science and non-science areas but were accepted at a higher rate. This may imply that humanities majors do not feel the need to compensate in either science or non-science areas for not specializing in the "premedical sciences." It also suggests that admissions committees in the medical schools do not demand such.

Table 2 presents Medical College Admission Test (MCAT) score data for examinees, applicants, and accepted students by major. Humanities majors earned scores similar to natural science majors in Science Knowledge subtests

TABLE 1

Mean Grade-Point Averages for Humanities and Natural Science Major Applicants and Accepted Students to the 1978–79 Entering Class to Medical School*

Major	Science GPA	Other GPA	Total GPA
Applicants			
Natural Science (N = 22,517)			
Mean	3.29	3.42	3.33
S.D.	.46	.41	.41
Humanities (N = 963)			
Mean	3.25	3.34	3.28
S.D.	.47	.40	.39
Accepted Students			
Natural Science (N = 10,476)			
Mean	3.50	3.57	3.52
S.D.	.38	.34	.34
Humanities (N = 491)			
Mean	3.43	3.45	3.43
S.D.	.41	.35	.34

* Natural science majors include: chemistry, physics, biology, anatomy, biochemistry, biomedical science, botany, chemistry and biology, genetics, human biology, microbiology, neuroscience, nutrition, pathology, psychobiology, pharmacology, physiology, science (other biological), and zoology; humanities majors include: art, classics, English, foreign language, humanities, literature, linguistics, library science, music, philosophy, religion, speech and theater arts.

TABLE 2

Mean MCAT Scores for Humanities and Natural Science Majors for the Spring 1977 Examinees and 1978–79 Entering Class Applicants and Accepted Students*

Major	Biol	Chem	Phy	SP	SA:R	SA:Q
Spring 1977						
Examinees						
Natural Science (N = 21,487)						
Mean	8.07	8.11	8.00	8.11	7.98	8.02
S.D.	2.40	2.56	2.48	2.49	2.40	2.50
Humanities (N = 710)						
Mean	7.97	8.13	8.02	8.04	8.82	8.39
S.D.	2.38	2.47	2.44	2.48	2.21	2.40
Applicants						
Natural Science (N = 24,140)						
Mean	8.53	8.48	8.41	8.54	8.35	8.42
S.D.	2.25	2.56	2.39	2.37	2.25	2.41
Humanities (N = 985)						
Mean	8.44	8.51	8.50	8.45	9.07	8.79
S.D.	2.14	2.45	2.28	2.28	2.00	2.19
Accepted Students						
Natural Science (N = 11,193)						
Mean	9.42	9.61	9.39	9.59	9.08	9.29
S.D.	1.88	2.17	2.22	2.01	1.83	2.02
Humanities (N = 503)						
Mean	9.27	9.58	9.28	9.43	9.68	9.57
S.D.	1.82	2.00	2.10	1.89	1.58	1.75

* For definition of natural science and humanities majors, see footnote on Table 1. MCAT subtest and assessment area abbreviations are: Biol = biology, Chem = chemistry; Phy = physics; SP = Science Problems; SA:R = Skills Analysis: Reading; SA:Q = Skills Analysis: Quantitative.

in biology, chemistry, and physics and in Science Problems. They obtained appreciably higher ones in Skills Analysis:Reading and Skills Analysis:Quantitative. Although the average score for each major category and for each subtest was greater for applicants (than examinees) and still greater for accepted students, the changes for humanities majors and natural science majors are comparable.

Despite the fact that these two groups do not appear to differ appreciably in academic record and MCAT scores, they do differ in their rate of acceptance, which suggests that other factors influence admissions decisions. Humanities majors have a higher acceptance rate (50 percent) than natural science majors (45.7 percent). Further, the higher acceptance rate for humanities is observed in the case of both sexes. In the natural sciences, males have an acceptance rate of 47.0 percent and females 44.4 percent. In the humanities, males have an acceptance rate of 52.3 percent and females, 48.6 percent.

MARIA THOMAE-FORGUES, *research assistant, and* JAMES B. ERDMANN, PH.D., *director, Division of Educational Measurement and Research, Association of American Medical Colleges, Washington, D.C.*

NOTE

ONLY THE FOLLOWING PAGES OF THIS PUBLICATION

HAVE BEEN FILMED

Cover 1, p. i,

1042-1044.